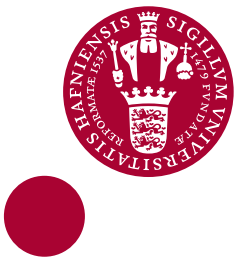

Carbon isotope fluctuations and benthic environments in the north-alpine Rhaetian

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The end-Triassic biotic crisis near to the Triassic/Jurassic boundary (TJB) is well-known as one of the "Big Five" mass extinctions. The processes, which may have caused this crisis are still controversely discussed. A worldwide negative excursion of $\delta_{13}C$ close to the TJB is thought to be caused either by sudden decrease in primary productivity, CO_2 outgassing during the end-Triassic CAMP volcanic activity, or the addition of isotopic light carbon from methan hydrates. The perturbation of the carbon cycle has also been documented by changes in the isotopic composition of fossil leaves and changes of the stomatal characters indicating a high CO_2 concentration in the atmosphere. According to these hypotheses the global T/J biotic crisis was a catastrophic event in the latest Rhaetian. Studies of the stratigraphic record of marine animal genera however suggest high extinction rates during Norian and Rhaetian times and the diversity decline was not just a result of extinction but also due to low origination rates of taxa and may thus not be classified as a true "mass extinction event". According to some authors the "end-Triassic mass extinction" is the result of an artificial concentration of extinctions at the TJB due to "compiled correlation effect" in the literature. Recent analysis of stomatal index and density of fossil seedfern leaves and geochemical research on pedogenic carbonate nodules are suggestive of strongly rising atmospheric CO_2 concentration and fluctuating climate in the Rhaetian. It seems therefore probable that the end-Triassic event was preceded by climatic change, which effected the composition and diversity of terrestrial and marine biota prior to the TJB interval. This hypothesis is supported by new carbon isotope data from the Rhaetian Kössen Formation, which point to perturbations of the global carbon cycle in the Late Rhaetian. The stratigraphic interval with the most significant $\delta_{13}C$ negative shift, termed as Late Rhaetian Event (LRE), has been studied in detail with respect to changes of facies and microfossil associations. The data show that the microbenthic communities were largely controlled by fluctuations of oxygen concentration related to sea level changes but were not affected by the LRE. Palynological results however suggest a climatic shift towards higher humidity during this interval.